Amendments to the Claims:

1. (Original) A method of improved coil sensitivity estimation for reducing artifacts in an MRI apparatus utilizing parallel imaging, the method comprising:

for a parallel imaging sequence, performing a calibration sequence relative to the parallel imaging sequence, using one of:

a spin echo type sequence matching the in-plane phase encode direction of the calibration and the parallel imaging sequences for each calibration; and

a gradient echo type sequence matching the in-plane phase encode direction of the calibration and the parallel imaging sequences for each calibration.

2. (Original) The method as set forth in claim 1, wherein the calibration sequence is performed for each parallel imaging sequence.

3. (Original) The method as set forth in claim 2, wherein the calibration sequence is performed prior to each said parallel imaging sequence.

4. (Previously Presented) The method as set forth in claim 1, wherein the gradient echo type calibration sequence is performed with a very short echo time, e.g. less than 5 ms.

5. (Original) The method as set forth in claim 1, further including:

using an essentially identical read out gradient in both the calibration sequence and the parallel imaging sequence.

6. (Original) The method according to claim 1, wherein a phase encode direction of said calibration sequence is essentially directed in along a phase encode direction of said parallel imaging sequence.

7. (Previously Presented) An MRI apparatus having a sequence controller programmed to perform the method as set forth in claims 1.

8. (Currently Amended) An MRI apparatus that includes:

an open magnet system for generating a B_0 magnetic field in an examination zone~~, the apparatus comprising:~~;

~~means~~ an RF system for exciting and manipulating magnetic resonance in the examination zone;

~~means~~ a gradient system for spatially encoding the magnetic resonance;

a plurality of RF receive coils with differing sensitivity profiles for receiving resonance signals in parallel;

~~means~~ a reconstruction processor for reconstructing received resonance signals into image representations;

~~means~~ a calibration processor for generating sensitivity profiles of the coils from image representations generated during a calibration scan;

~~means~~ a reconstruction processor for generating a diagnostic image from the sensitivity profiles and image representations generated during a diagnostic scan;

sequence control ~~means for accessing~~ accesses a calibration sequence memory ~~means~~ to retrieve ~~one of~~ an RF refocused spin echo type sequence ~~and a gradient recalled echo type sequence~~ and controlling the ~~resonance exciting means~~ RF system and the ~~spatial encoding means~~ gradient system in accordance with the retrieved calibration sequence to generate resonance signals for the reconstruction ~~means~~ processor to reconstruct into ~~the~~ calibration image representations and ~~for accessing~~ accesses a diagnostic imaging sequence memory ~~means~~ to retrieve a diagnostic imaging sequence and controlling the ~~resonance exciting means~~ RF system and the ~~spatial encoding means~~ gradient system to generate resonance signals for the reconstruction ~~means~~ processor to reconstruct into the diagnostic image representations.

9. (New) The magnetic resonance apparatus as set forth in claim 8, wherein the sequence control retrieves a phase encode gradient direction from the diagnostic imaging sequence memory and causes the gradient system to apply a phase encode gradient during the calibration sequence which is in the retrieved phase encode direction.

10. (New) The MRI apparatus as set forth in claim 9, wherein the sequence control retrieves a read gradient from the diagnostic imaging sequence memory and causes the gradient system to apply the retrieved read gradient to read out echo signals during the calibration sequence.

11. (New) The MRI apparatus as set forth in claim 8, wherein the sequence control retrieves a read gradient from the diagnostic imaging sequence memory and causes the gradient system to apply the retrieved read gradient to read out echo signals during the calibration sequence.

12. (New) The MRI apparatus as set forth in claim 8, wherein the sequence control applies a diagnostic imaging sequence other than a spin echo imaging sequence.

13. (New) A magnetic resonance method comprising:

prior to conducting a parallel imaging sequence in which resonance data is phase encoded in a selected phase encode direction and resonance data is read out with a selected read gradient, conducting a calibration sequence including:

generating a series of spin echoes;

phase encoding the spin echoes in said selected phase encode direction;

generating sensitivity maps from the spin echoes;

conducting the parallel imaging sequence to generate resonance data;

reconstructing the resonance data into folded images;

unfolding the folded images using the generated sensitivity maps.

14. (New) The magnetic resonance method as set forth in claim 13, wherein the calibration sequence further includes:

reading out the spin echoes using said retrieved parallel imaging sequence read gradient.

15. (New) The magnetic resonance method as set forth in claim 13, wherein the parallel imaging sequence is a sequence other than a spin echo sequence.

16. (New) The magnetic resonance method as set forth in claim 13, wherein the parallel imaging sequence and the calibration sequence are conducted in an examination region of an open MRI magnet system.

17. (New) The method as set forth in claim 1, wherein the method is performed in an examination region of an open magnet MRI system in which a B_0 magnetic field rolls over relatively gradually at edges of a field of view which tends to cause phase errors.

18. (New) The method as set forth in claim 17, wherein the calibration sequence uses spin echoes which refocuses phase errors, effectively cancelling the phase errors.

19. (New) The method as set forth in claim 17, wherein the calibration sequence uses a gradient echo type sequence with a short echo time to minimize accumulated phase errors.